

WHAT IS CLAIMED IS:

1. An electrically driven power steering apparatus
comprising:

a housing;

5 a ball screw shaft extending within said housing and
connected to a steering mechanism;

an input shaft to which a steering force is inputted;

an output shaft for receiving the steering force from
said input shaft and outputting the steering force to said
10 ball screw shaft;

a torque sensor for detecting a torque transferred
between said input shaft and said output shaft;

a motor including a rotor; and

a ball screw nut for giving a force in an axial direction
15 to said ball screw shaft by receiving a rotational force
from said motor,

wherein an elastic member deforming and thus capable
of absorbing an impact inputted from the side of said ball
screw shaft, is disposed on a power transmission route between
20 said ball screw shaft and said rotor of said motor.

2. An electrically driven power steering apparatus
according to claim 1, wherein said elastic member is disposed
between said ball screw nut and said rotor of said motor,
25 and

the impact inputted from the side of said ball screw
shaft is absorbed by a torsional damper effect.

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3. An electrically driven power steering apparatus according to claim 6, wherein a displacement limiter for limiting a predetermined or larger quantity of deformation of said elastic member is provided and constructed of a recessed portion formed in one of said rotor of said motor and said ball screw nut and a protruded portion formed on the other, and

5 said protruded portion, when said elastic member deforms by the predetermined quantity, engages with said recessed portion.

~~4. An electrically driven power steering apparatus comprising:~~

15 a housing;

a ball screw shaft extending within said housing and connected to a steering mechanism;

an input shaft to which a steering force is inputted;

an output shaft for receiving the steering force from said input shaft and outputting the steering force to said ball screw shaft;

20 a torque sensor for detecting a torque transferred between said input shaft and said output shaft;

a motor including a rotor; and

25 a ball screw nut for giving a force acting in an axial direction to said ball screw shaft by receiving a rotational force from said motor,

wherein an elastic member deforming and thus capable of absorbing an impact inputted from the side of said ball screw shaft, is disposed on a support portion of said ball screw nut.

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5. An electrically driven power steering apparatus according to claim 4, wherein said elastic member is disposed between said housing and a bearing for supporting said ball screw nut so as to be rotatable with respect to said housing or between said bearing and said ball screw nut.

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6. An electrically driven power steering apparatus according to claim 5, wherein said bearing and said housing relatively move in the axial direction corresponding to the axis-directional deformation of said elastic member, and

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there is provided a displacement limiter for limiting a predetermined or larger quantity of deformation of said elastic member by limiting the relative movements of said bearing and said housing in the axial direction.

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7. An electrically driven power steering apparatus according to any one of claims 1 through 6, wherein said rotor of said motor and said ball screw nut are connected by an engagement between a female spline and a male spline of which at least one toothed surface is coated with a resin.

25

~~8. An electrically driven power steering apparatus~~

according to any one of claims 1 through 7, wherein said displacement limiter limits the predetermined or larger quantity of deformation of said elastic member at 40% or smaller of a maximum steering force exhibited by said motor.

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9. An electrically driven power steering apparatus according to any one of claims 1 through 8, wherein a natural oscillation frequency of a system constructed of said rotor, said ball screw nut and said elastic member is set to 7 Hz or higher.

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10. An electrically driven power steering apparatus comprising:

a housing;

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a ball screw shaft extending within said housing and connected to a steering mechanism;

a motor having a rotor;

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a ball screw nut, connected to said rotor of said motor, for converting a rotational force of said rotor into a force acting in an axial direction and transferring the same force to said ball screw shaft;

a bearing for supporting said ball screw nut to as to be rotatable with respect to said housing; and

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a presser member, screwed to said ball screw nut, for thus pressing said bearing against said ball screw nut,

wherein said presser member includes a connection member for connecting said presser member to said ball screw

~~nut so that said presser member and said ball screw nut are~~
unable to relatively rotate.

11. An electrically driven power steering apparatus
5 according to claim 10, wherein said connection member
connects said presser member to said ball screw nut so as
to be unable to relatively rotate by use of a shearing force
of a resinous material.

10 12. An electrically driven power steering apparatus
according to claim 10, wherein said connection member
connects said presser member to said ball screw nut so as
to be unable to relatively rotate by use of a frictional
force.

15 13. An electrically driven power steering apparatus
according to any one of claims 10 through 12, wherein said
presser member is screwed to said ball screw nut and thus
20 ~~adjusts a backlash of the balls within said ball screw nut.~~

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